

CNS Implementation An Airline Perspective

NASA ICNS Conference

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Ira G. Pearl - Delta Air Lines

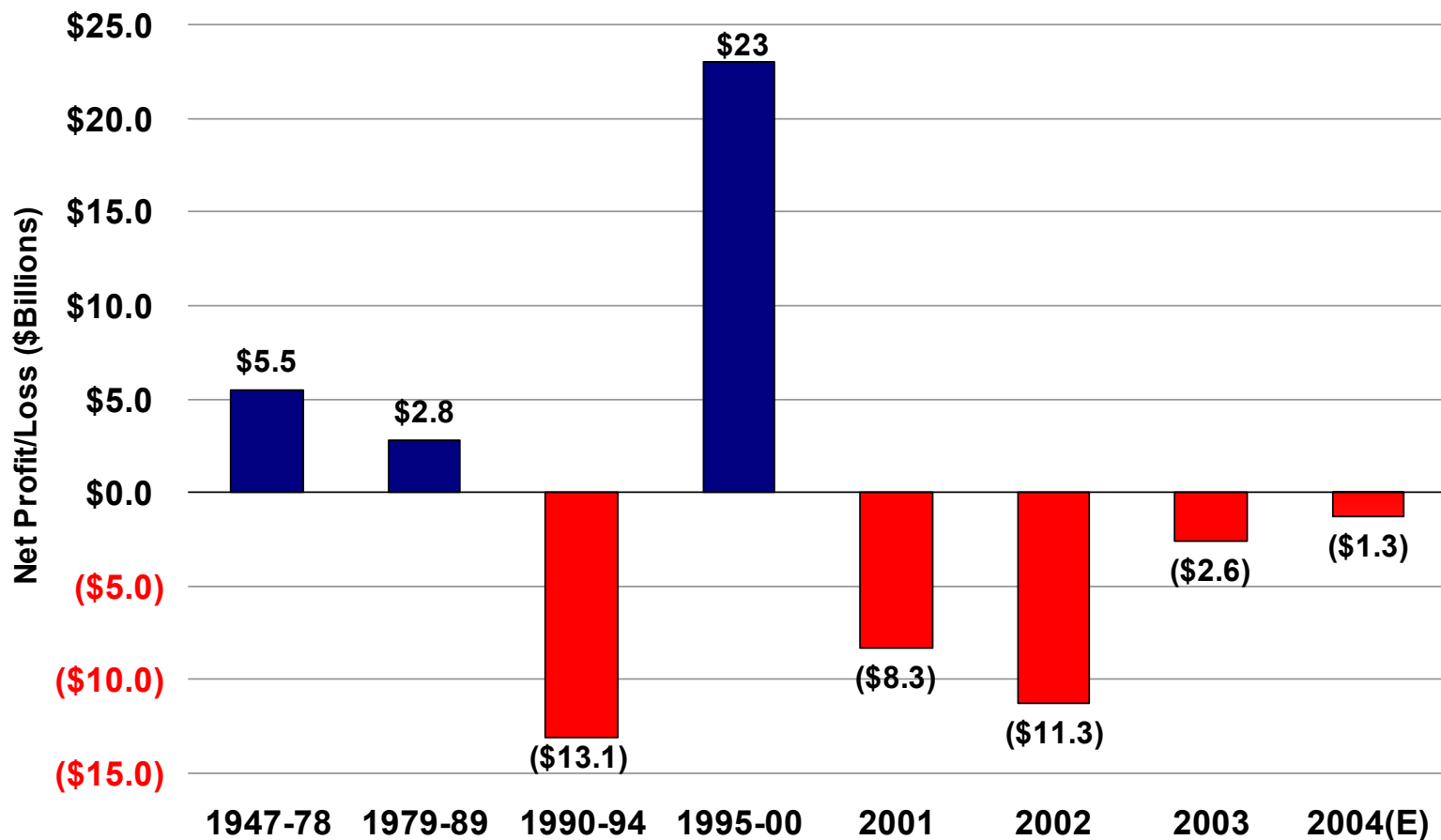
Overview

- Airline Financial Condition
- Retrofit Program Costs
- Implementation Drivers
- Who Should Pay
- Equipage Mandates
- Delta Equipage
- Future Vision



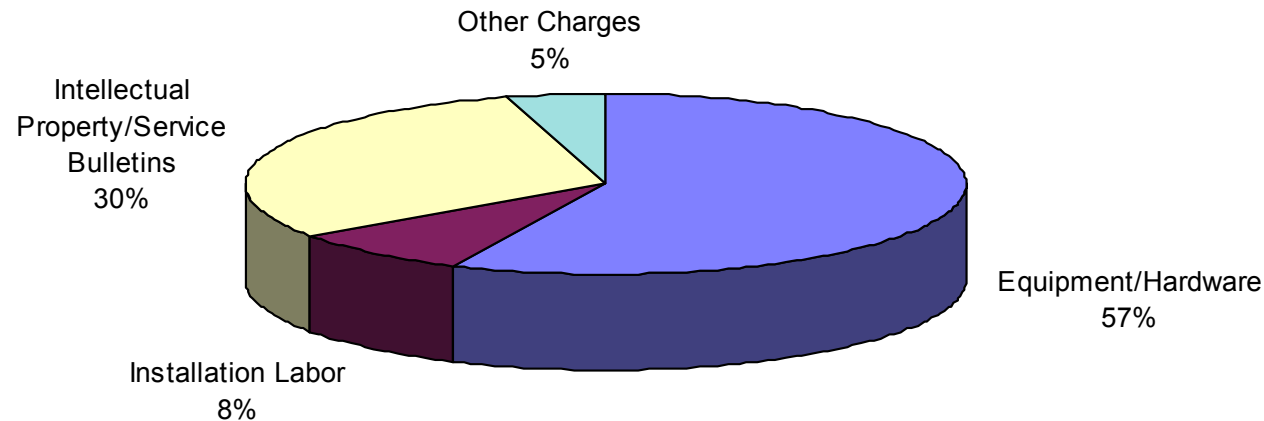
Airline “Earnings” = Cumulative Net Loss

Net Loss for 2001-04 Will Exceed Net Profit for 1995-2000

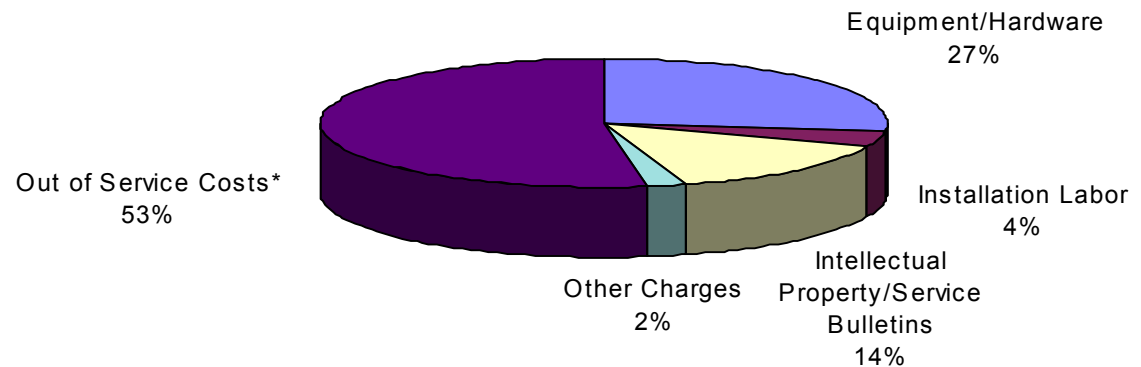


Retrofit Timing

Pegasus FMC on 757/767 (During D Check)

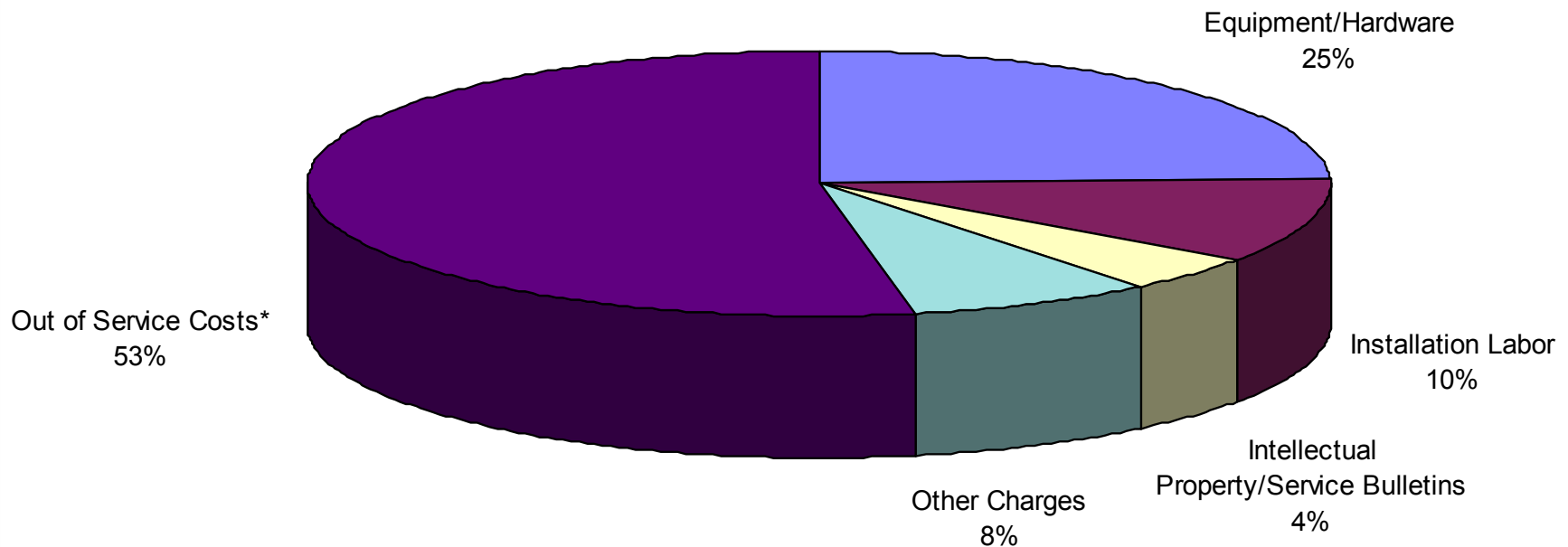


Pegasus FMC on 757/767 (Special Schedule)



Impact of Short-Fuse Mandates

767ER and 777 Downlink of Aircraft Parameters



Program Implementation Drivers

Mandatory

Optional

**Required by
Law or Regulation**

*Have
to
Do*

**Want to Do
Need to Do
Don't Want to Do**

Who Should Pay?

- Government?
 - Government's role to maintain robust transportation infrastructure
 - Programs that benefit all users, should be paid for by the government
 - e.g., lessen airspace or frequency congestion
- Airspace Users?
 - Should pay for avionics when the user benefits, rather than the entire system
 - e.g., GPS for RNP Approaches



Decision Making & Commitment

- History of False Starts
 - Future Air Navigation System (FANS)
 - Controller Pilot Data Link (CPDLC VDL-2)
- A Clear Path Forward
 - FAA Leadership Role
 - Must not abdicate global leadership
 - Solid Investments
 - Based on Performance, NOT necessarily Equipage
- Mandates
 - Forward Fit vs. Retrofit
- Must Deliver value for equipage already installed

Priorities

- **Navigation**
 - RNAV Everywhere, RNP where required
 - RNAV SIDS & STARS
 - 4-D Navigation /Required Time of Arrival
 - Capacity & efficiency are needed now
- **Communication**
 - CPDLC – Global Consistency
- **Surveillance**
 - ADS-B (where no radar coverage exists)

Fleet Equipage

| Aircraft | Number | Capability | | | | |
|--------------|--------|-------------------|-------|-------------------------|-------------------------|-------------------------|
| | | FMS | CPDLC | FANS | GPS | ADS-B Mode S |
| 727-200/-300 | 78 | No | No | No | No | No |
| 737-800 | 71 | 1 MB | Yes | No | Yes | No |
| MD-88/90 | 136 | 200K (to 650K) | No | No | TBD | No |
| 757/767 | 172 | 200K & 1MB | No | In Progress ECD 2009 | In Progress ECD 2009 | No |
| 767-300ER | 51 | 200K & 1MB | No | In Progress ECD 2009 | In Progress ECD 2009 | In Progress ECD 2007 |
| 767-400 | 21 | 1 MB | Yes | No | Yes | No |
| 777-200 | 8 | 1 MB | No | Yes | Yes | In Progress ECD 2007 |

Equipage – Existing Technology

(If Cost not an Issue)

- Dual FMS
- GPS
- RNAV – RNP (Nav Performance Scales)
 - EnRoute
 - Terminal
 - Approach
- CPDLC – ATN/VDL-2
- ADS-B (plane to plane)



Future Vision

“Delta 123, pre departure clearance is: DCA RNAV 1 Departure, Direct MACEY, ATL RNAV 3 Arrival, RTA is LOGEN at 14:25:45”

“Delta 123, Taxi into position and hold”

“Delta 123, cleared for takeoff, contact departure at 123.05”

“Delta 123, monitor 118.50 and CPDLC

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CPDLC System Log-in Complete
DL123 Freq Change to 126.17
DL123 Freq Change to 125.30
DL123 Freq Change to 119.45
DL123 CTC Approach on 121.0
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“Delta 123, Welcome to Atlanta, your cleared for the ILS Approach for Runway 28, cleared to land. Monitor Tower on 123.85”

Takeaways

- Retrofits are costly
 - Long compliance timelines must be set to mitigate cost
 - Airline finances are tenuous
- FAA should establish a clear path
- FAA must facilitate harvesting value of CNS Avionics investments
- Government should pay when the NAS benefits
 - Users should pay when individual users benefit

A Clear Target for CNS Equipage and Benefits must be Established